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(54) **SERVER DEVICE**

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H05K 7/1491 (2013.01); *H05K 7/20172*
(2013.01)

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(58) **Field of Classification Search**
None
See application file for complete search history.

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(56) **References Cited**

U.S. PATENT DOCUMENTS

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6,580,603	B1 *	6/2003	Resnick	G06F 1/184 312/223.1
9,229,496	B2 *	1/2016	Cravens	H05K 7/1487
9,532,480	B2 *	12/2016	Shen	G06F 1/184
9,867,307	B2 *	1/2018	Kurosaki	H05K 7/1489
9,955,607	B1 *	4/2018	Valentine	H05K 7/1488
2006/0250766	A1 *	11/2006	Blaalid	G06F 1/187 361/679.33

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(Continued)

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(30) **Foreign Application Priority Data**

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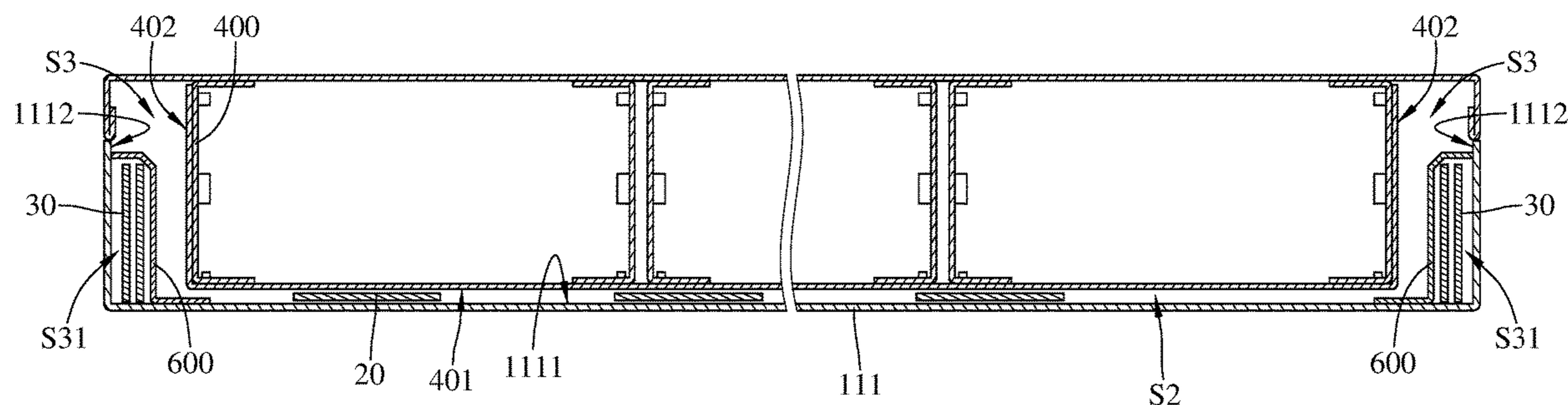
(51) **Int. Cl.**
H05K 7/14 (2006.01)
H05K 7/20 (2006.01)
H05K 5/03 (2006.01)
H05K 5/02 (2006.01)

(57) **ABSTRACT**

A server device includes a case, first, second and third hard disk brackets and a first cable management cover. The case includes a main part and an expansion part disposed on the main part. The first hard disk bracket is fixed to the expansion part. The second and third hard disk brackets are pivotably disposed on the main part. A first cable management space is formed between each of two opposite exterior surfaces of the second hard disk bracket and each of two opposite interior surfaces of the main part. The second hard disk bracket is between the first and third hard disk brackets. A second cable management space is between a bottom surface of the third hard disk bracket and a supporting surface of the main part. A first cable management cover is in one of the first cable management spaces and fixed to the main part.

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10 Claims, 9 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

2009/0273896	A1 *	11/2009	Walker	G06F 1/187 361/679.33
2013/0003317	A1 *	1/2013	Gong	H05K 7/1491 361/726
2013/0214658	A1 *	8/2013	Liang	H05K 7/1491 312/223.2
2015/0342080	A1 *	11/2015	Chen	G11B 33/128 361/679.31
2016/0135322	A1 *	5/2016	Chen	G11B 33/142 361/679.46

* cited by examiner

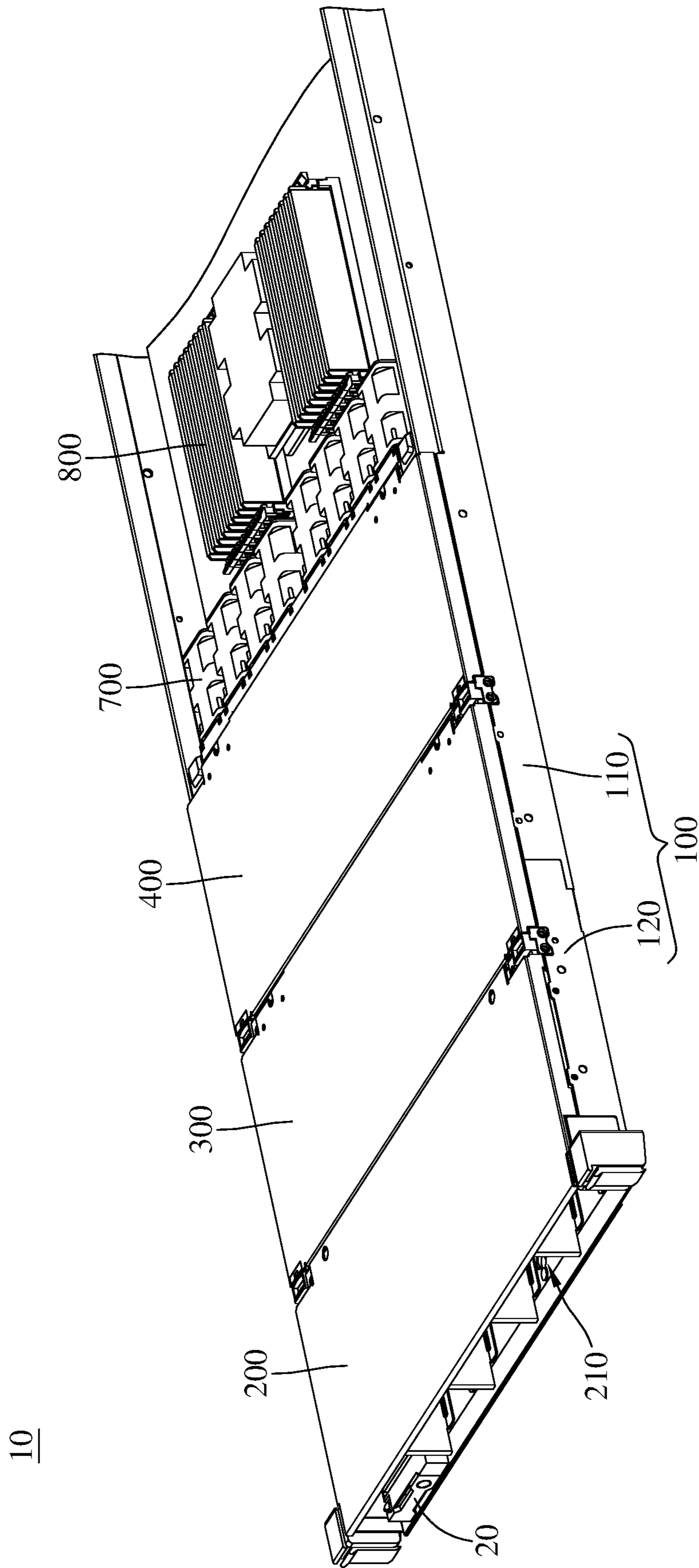


FIG. 1

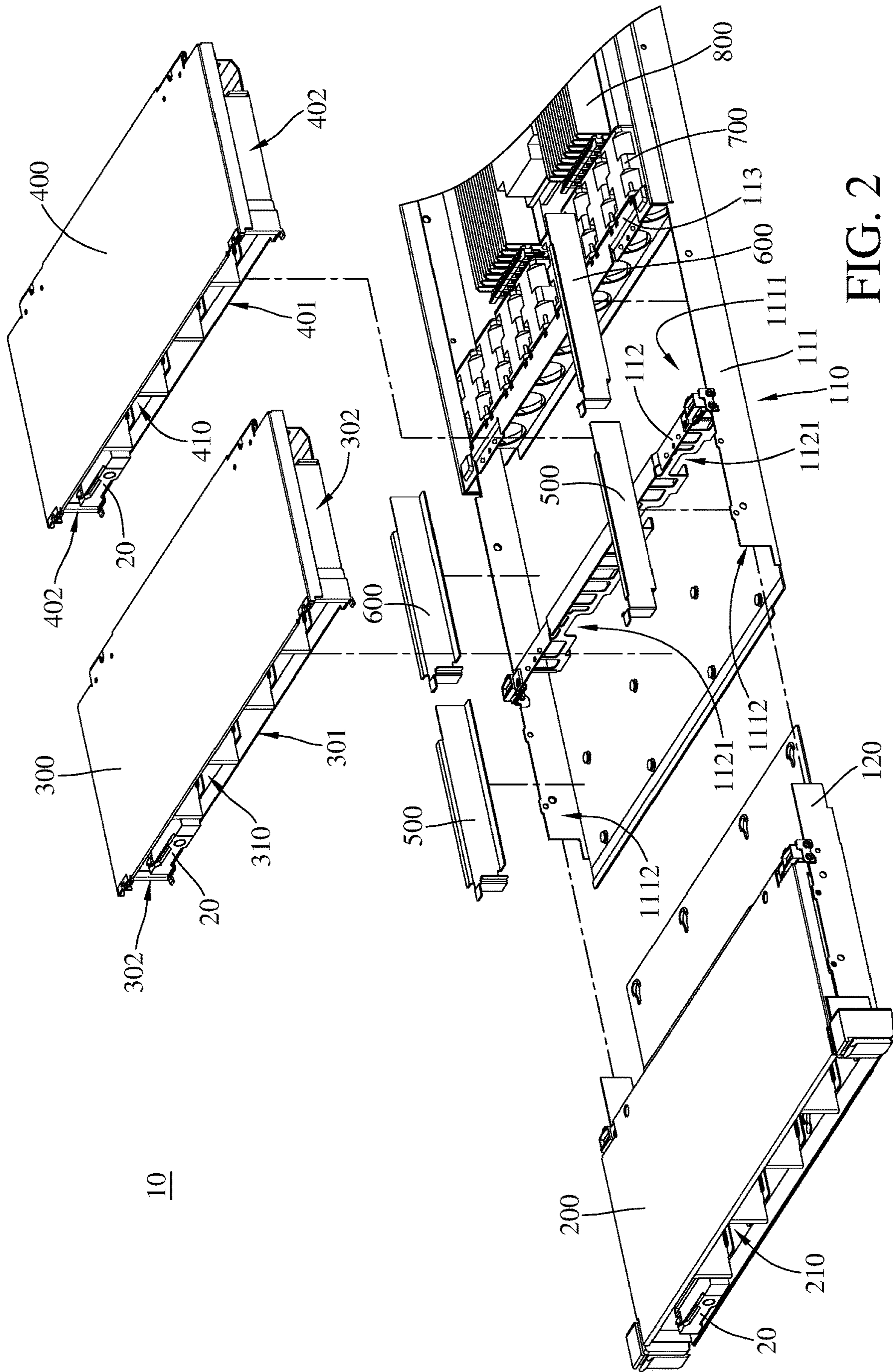


FIG. 2

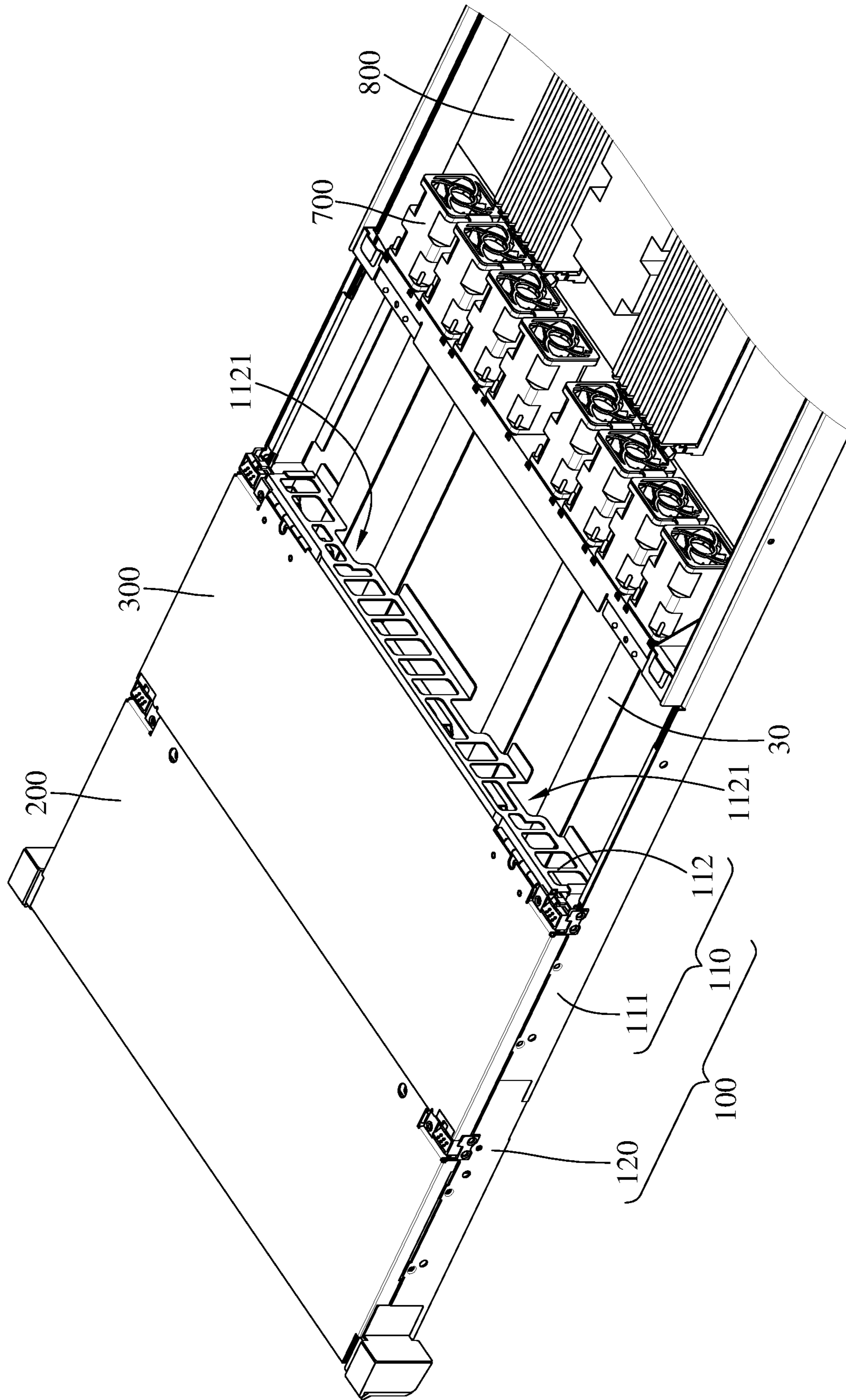


FIG. 4

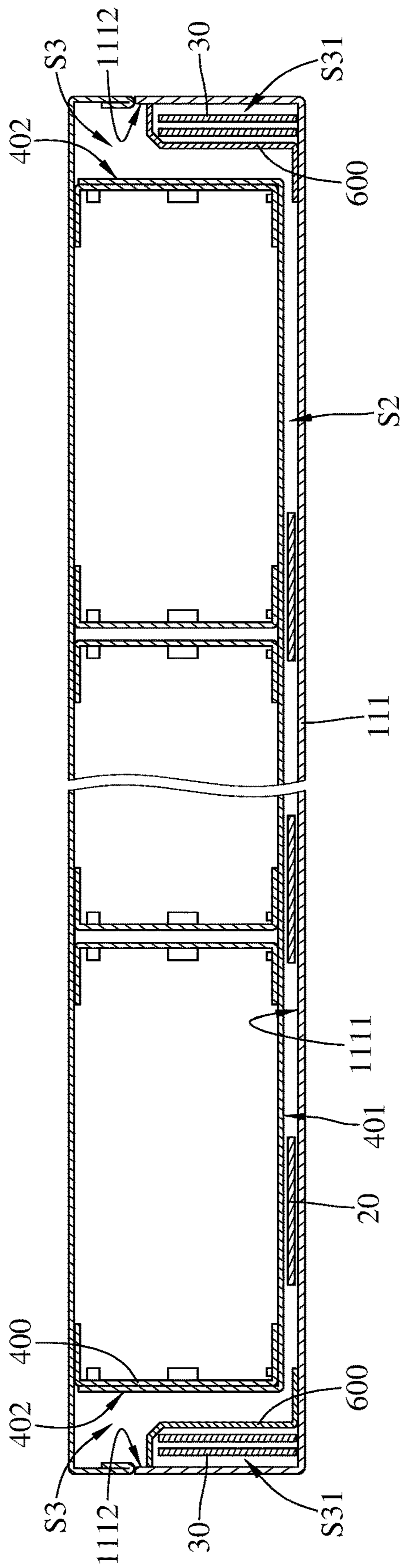


FIG. 5

112

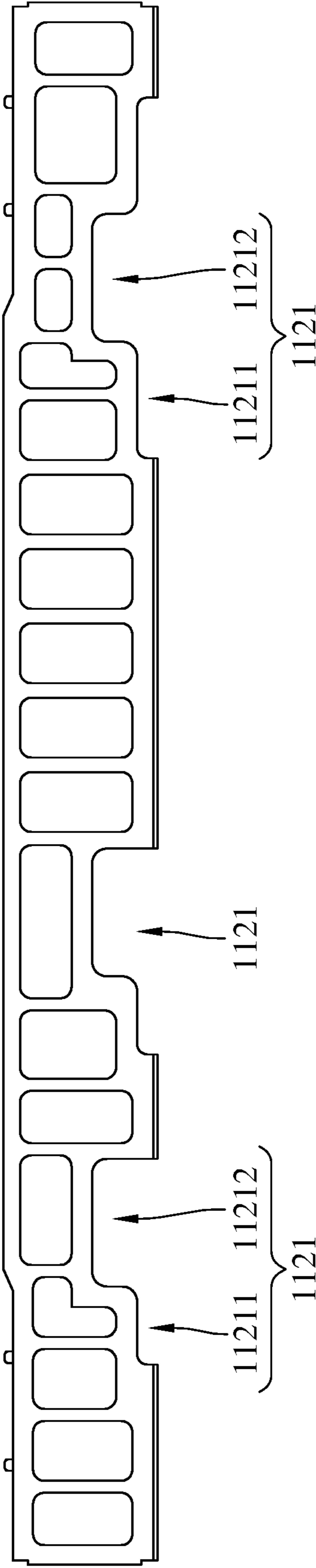


FIG. 6

10a

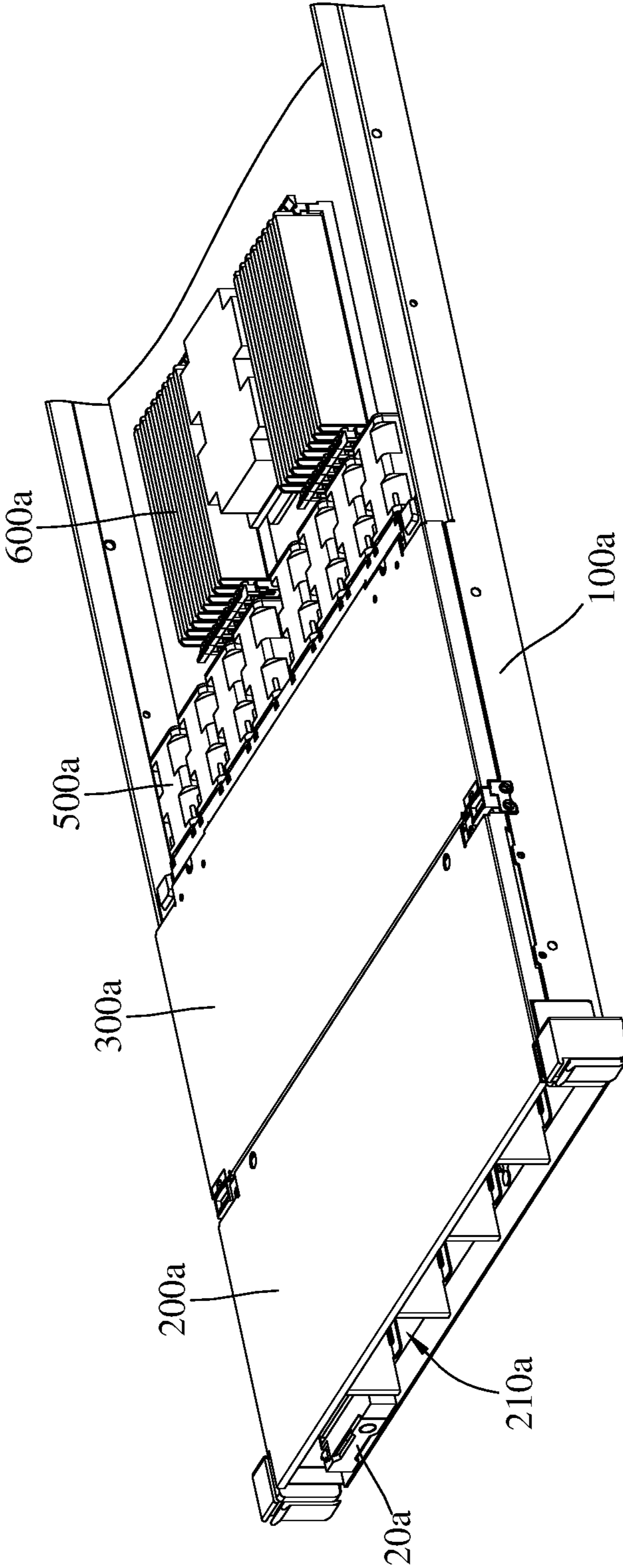


FIG. 7

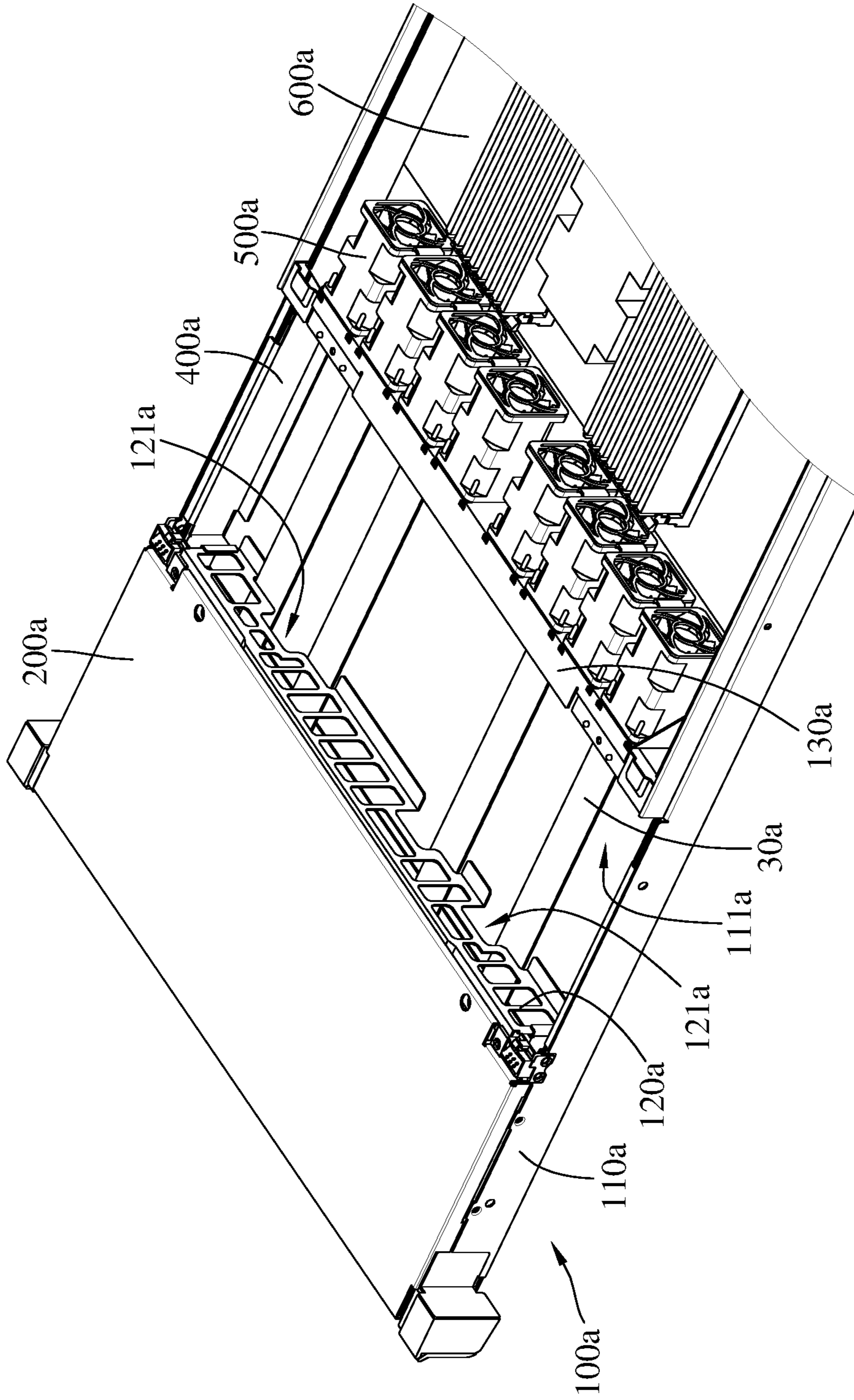


FIG. 8

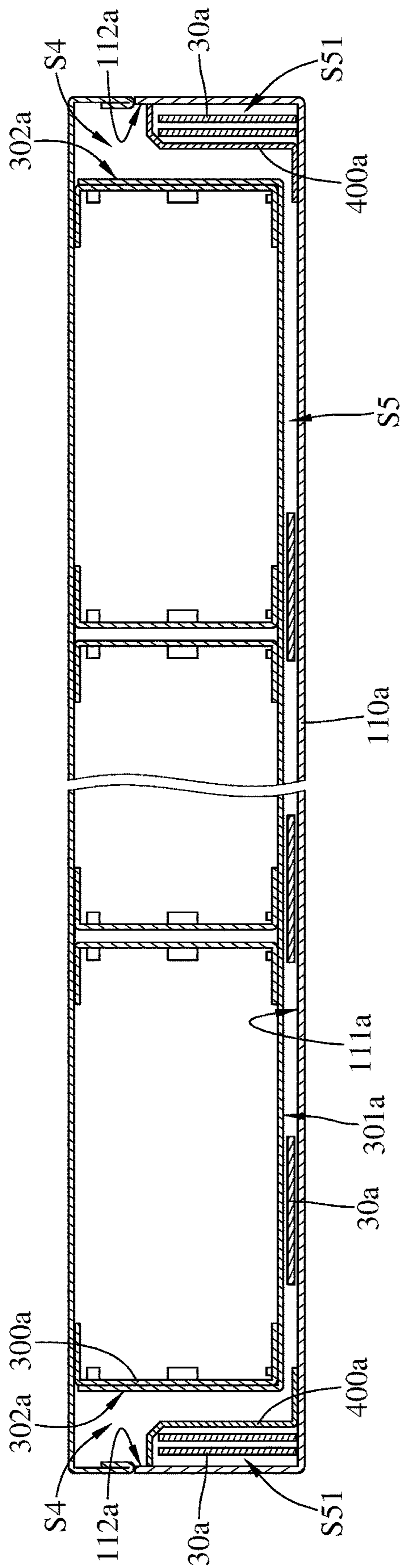


FIG. 9

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SERVER DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This non-provisional application claims priority under 35 U.S.C. § 119(a) on Patent Application No(s). 202010198000.2 filed in China on Mar. 19, 2020, the entire contents of which are hereby incorporated by reference.

TECHNICAL FIELD

This disclosure relates to a server device, more particularly to a server device including cable management structure.

BACKGROUND

As the computer technology progresses, desktop computers, laptop computers or other types of portable computer are widely used in daily life. In addition to the advancement of the communication technology, cross-border e-commerce becomes a major trend. Personal computers are not sufficient to process a massive amount of data generated in the global e-commerce market. As a result, a server (e.g., a rack server, a blade server or tower server) is provided.

A rack server is, for example, installed in a server rack, and the server rack may accommodate other rack servers at the same time. The rack server not only occupy a small space of the server rack, but also is easily to be managed. Moreover, the rack server may collaborate with other rack servers in the server rack to improve computing performance or data storage capacity. However, when electronic devices, such as hard disk drives, in the server are arranged compactly, a problem of lacking cable management space may occur because compact arrangement of hard disk drives may reduce the space where cables can be disposed. Therefore, how to maintain the performance of the server while achieving cable management is an important topic to relevant research and development teams.

SUMMARY

The present disclosure is to provide a server device, which is capable of maintaining the performance thereof while achieving cable management.

One embodiment of the disclosure provides a server device. The server device includes a case, a first hard disk bracket, a second hard disk bracket, a third hard disk bracket and at least one first cable management cover. The case includes a main part and an expansion part mounted to one side of the main part. The first hard disk bracket is fixed to the expansion part of the case. The second hard disk bracket is pivotably disposed on the main part of the case. A first cable management space is formed between one of two opposite exterior surfaces of the second hard disk bracket and one of two opposite interior surfaces of the main part of the case, and another first cable management space is formed between the other of the two opposite exterior surfaces of the second hard disk bracket and the other of the two opposite interior surfaces of the main part. The third hard disk bracket is pivotably disposed on the main part of the case. The second hard disk bracket is located between the first hard disk bracket and the third hard disk bracket, and at least one second cable management space is formed between a bottom surface of the third hard disk bracket and a supporting surface of the main part of the case. The at least one first

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cable management cover is located in one of the two first cable management spaces and fixed to the main part of the case.

One embodiment of the disclosure provides a server device. The server device includes a case, a first hard disk bracket, a second hard disk bracket and at least one first cable management cover. The first hard disk bracket is fixed to the case. The second hard disk bracket is pivotably disposed on the case. A first cable management space is formed between one of two opposite exterior surfaces of the second hard disk bracket and one of two opposite interior surfaces of the case, and another first cable management space is formed between the other of the two opposite exterior surfaces of the second hard disk bracket and the other of the two opposite interior surfaces of the case. At least one second cable management space is formed between a bottom surface of the second hard disk bracket and a supporting surface of the case. The at least one first cable management cover is located in one of the two first cable management spaces and fixed to the case.

According to the server device as described above, the cable management spaces for cables to be disposed therein are provided on opposite sides or under the second hard disk bracket or the third hard disk bracket so as to maintain the performance of the server while achieving easy cable management.

BRIEF DESCRIPTION OF THE DRAWINGS

The present disclosure will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only and thus are not limitative of the present disclosure and wherein:

FIG. 1 is a perspective view of a server device in accordance with the first embodiment of the disclosure;

FIG. 2 is an exploded view of the server device in FIG. 1;

FIG. 3 is a cross-sectional view of the server device in FIG. 1;

FIG. 4 is a partial perspective view of the server device in FIG. 1;

FIG. 5 is another cross-sectional view of the server device in FIG. 1;

FIG. 6 is a planar view of a first partition part of the server device in FIG. 2;

FIG. 7 is a perspective view of a server device in accordance with the second embodiment of the disclosure;

FIG. 8 is a partial perspective view of the server device in FIG. 7; and

FIG. 9 is a cross-sectional view of the server device in FIG. 7.

DETAILED DESCRIPTION

In the following detailed description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, that one or more embodiments may be practiced without these specific details. In other instances, well-known structures and devices are schematically shown in order to simplify the drawings.

Please refer to FIG. 1 to FIG. 3. FIG. 1 is a perspective view of a server device in accordance with the first embodiment of the disclosure, FIG. 2 is an exploded view of the server device in FIG. 1, and FIG. 3 is a cross-sectional view of the server device in FIG. 1.

In this embodiment, a server device **10** is provided. The server device **10** includes a case **100**, a first hard disk bracket **200**, a second hard disk bracket **300**, a third hard disk bracket **400**, and two first cable management covers **500**. In this embodiment, the server device **10** may, for example, further include two second cable management covers **600**. The case **100** includes a main part **110** and an expansion part **120**. The expansion part **120** is detachably mounted to one side of the main part **110**. In this embodiment, the expansion part **120** can, for example, be quickly mounted or removed from the main part **110** by the cooperation of pear-shaped holes and engagement pins respectively provided thereon.

The main part **110** includes an accommodation portion **111**, a first partition part **112**, and a second partition part **113**. The accommodation portion **111** has a supporting surface **1111**. The supporting surface **1111** is configured to support objects. The first partition part **112** and the second partition part **113** stand on the supporting surface **1111** of the accommodation portion **111**, and they are spaced apart from each other.

The first hard disk bracket **200** is located on one side of the first partition part **112** located away from the second partition part **113**, and the first hard disk bracket **200** is fixed to the expansion part **120** of the case **100**. The first hard disk bracket **200** has a plurality of first installation openings **210** exposed to the outside. Users may, for example, insert hard disk drives **20** into the first hard disk bracket **200** through the first installation openings **210** or remove the hard disk drives **20** from the first hard disk bracket **200** through the first installation openings **210**.

The second hard disk bracket **300** is located on one side of the first partition part **112** located away from the second partition part **113**, and the second hard disk bracket **300** is located between the first hard disk bracket **200** and the first partition part **112**. The second hard disk bracket **300** is pivotably disposed on the main part **110** of the case **100**. The second hard disk bracket **300** has a plurality of second installation openings **310**, and the second hard disk bracket **300** is pivotable relative to the main part **110** of the case **100** to expose or conceal the second installation openings **310**. When the second installation openings **310** of the second hard disk bracket **300** are exposed to the outside, users may, for example, insert the hard disk drives **20** into the second hard disk bracket **300** through the second installation openings **310** or remove the hard disk drives **20** from the second hard disk bracket **300** through the second installation openings **310**.

In addition, a part of the expansion part **120** is located between a bottom surface **301** of the second hard disk bracket **300** and the supporting surface **1111** of the main part **110**. There is a first cable management space **S1** formed between one of two opposite exterior surfaces **302** of the second hard disk bracket **300** and one of two opposite interior surfaces **1112** of the main part **110** of the case **100**, and there is another first cable management space **S1** formed between the other of the two opposite exterior surfaces **302** and the other of the two opposite interior surfaces **1112**.

The third hard disk bracket **400** is located between the first partition part **112** and the second partition part **113**, and the third hard disk bracket **400** is pivotably disposed on the main part **110** of the case **100**. That is, the second hard disk bracket **300** is located between the first hard disk bracket **200** and the third hard disk bracket **400**. The third hard disk bracket **400** has a plurality of third installation openings **410**, and the third hard disk bracket **400** is pivotable relative to the main part **110** of the case **100** to expose or conceal the third installation openings **410**. When the third installation

openings **410** of the third hard disk bracket **400** are exposed to the outside, users may, for example, insert the hard disk drives **20** into the third hard disk bracket **400** through the third installation openings **410** or remove the hard disk drives **20** from the third hard disk bracket **400** through the third installation openings **410**.

Please refer to FIG. **4** and FIG. **5**. FIG. **4** is a partial perspective view of the server device in FIG. **1**, and FIG. **5** is another cross-sectional view of the server device in FIG. **1**. In this embodiment, there is at least one second cable management space **S2** formed between a bottom surface **401** of the third hard disk bracket **400** and the supporting surface **1111** of the main part **110** of the case **100**. There is at least one third cable management space **S3** formed between one of two opposite exterior surfaces **402** of the third hard disk bracket **400** and one of the two opposite interior surfaces **1112** of the case **100**, and there is at least one another third cable management space **S3** formed between the other of the two opposite exterior surfaces **402** and the other of the two opposite interior surfaces **1112**.

The two first cable management covers **500** are respectively located in the two first cable management spaces **S1** and fixed to the main part **110** of the case **100**. One of the two first cable management covers **500** and one of the two opposite interior surfaces **1112** of the main part **110** together surround a first channel **S11**, and the other of the two first cable management covers **500** and the other of the two opposite interior surfaces **1112** together surround another first channel **S11**. The first channels **S11** are configured for cables **30** to be disposed therein. The cables **30** located in the first channels **S11** can be covered and thus protected by the first cable management covers **500**, such that the cables **30** do not tangle with the second hard disk bracket **300** as the second hard disk bracket **300** is pivoted relative to the main part **110**. Therefore, the first cable management covers **500** can provide rooms to accommodate the cables **30**, and prevent the cables **30** from interfering the movement of the second hard disk bracket **300**, thereby providing a smooth movement of the second hard disk bracket **300**.

The two second cable management covers **600** are respectively located in the two third cable management spaces **S3** and fixed to the main part **110** of the case **100**. One of the two second cable management covers **600** and one of the two opposite interior surfaces **1112** of the main part **110** together surround a second channel **S31**, and the other of the two second cable management covers **600** and the other of the two opposite interior surfaces **1112** together surround another second channel **S31**. The second channels **S31** are configured for the cables **30** to be disposed therein. The cables **30** located in the second channel **S31** is covered and thus protected by the second cable management covers **600**, such that the cables **30** do not tangle with the third hard disk bracket **400** as the third hard disk bracket **400** is pivoted relative to the main part **110**. Therefore, the second cable management covers **600** can provide rooms to accommodate the cables **30**, and prevent the cables **30** from interfering the movement of the third hard disk bracket **400**, thereby providing a smooth movement of the third hard disk bracket **400**.

Please refer to FIG. **6**, which is a planar view of a first partition part of the server device in FIG. **2**. In this embodiment, the first partition part **112** has a plurality of through holes **1121**, and at least one of the through holes **1121** has a wide part **11211** and a narrow part **11212** connected to each other. The wide part **11211** is located closer to the supporting surface **1111** of the case **100** than the narrow part **11212** is to the supporting surface **1111** of the case **100**. Users may

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move the cables **30** to one side of the wide part **11211**, such that the cables **30** are pressed by the first partition part **112**, thereby positioning and arranging the cables **30**.

Please refer to FIG. 1 and FIG. 2 again. In this embodiment, the server device **10** may include, for example, a fan assembly **700** and a host assembly **800**. The fan assembly **700** is located between the third hard disk bracket **400** and the host assembly **800**.

Please refer to FIG. 3 again. In this embodiment, since a part of the expansion part **120** is located between the bottom surface **301** of the second hard disk bracket **300** and the supporting surface **1111** of the main part **110**, there is no sufficient room between the bottom surface **301** of the second hard disk bracket **300** and the supporting surface **1111** of the main part **110** for cable management. Thus, in this embodiment, the first cable management spaces **S1** on two opposite sides of the second hard disk bracket **300** of the server device **10** are provided for cable management. That is, the cables **30** for electrical connection between the hard disk drives **20** in the first hard disk bracket **200** and the host assembly **800** can pass through the first cable management spaces **S1** on opposite sides of the second hard disk bracket **300**.

Please refer to FIG. 4 and FIG. 5. Since the expansion part **120** is not located between the bottom surface **401** of the third hard disk bracket **400** and the carrying surface **1111** of the main part **110**, there is a sufficient room between the bottom surface **401** of the third hard disk bracket **400** and the supporting surface **1111** of the main part **110** for cable management. Therefore, in this embodiment, besides the third cable management spaces **S3** on opposite sides of the third hard disk bracket **400** of the server device **10**, the second cable management space **S2** located between the bottom surface **401** of the third hard disk bracket **400** and the supporting surface **1111** of the main part **110** can also be provided for cable management. That is, the cables **30** for electrical connection between the hard disk drives **20** in the first hard disk bracket **200** and the host assembly **800**, and the cables **30** for electrical connection between the hard disk drives **20** in the second hard disk bracket **300** and the host assembly **800** can pass through the third cable management spaces **S3** on opposite sides of the third hard disk bracket **400** or through the second cable management space **S2** under the third hard disk bracket **400**.

In the above embodiment, the quantity of the first cable management covers **500** is two, and the quantity of the second cable management covers **600** is two, but the present disclosure is not limited thereto. In some other embodiments, the quantity of the first cable management cover may be one, and the quantity of the second cable management cover may be one. In such configuration, the first and second cable management covers are each located in one of the cable management spaces on the sides of the hard disk brackets.

Please refer to FIG. 7 to FIG. 9. FIG. 7 is a perspective view of a server device in accordance with the second embodiment of the disclosure, FIG. 8 is a partial perspective view of the server device in FIG. 7, and FIG. 9 is a cross-sectional view of the server device in FIG. 7.

In this embodiment, a server device **10a** is provided. The server device **10a** includes a case **100a**, a first hard disk bracket **200a**, a second hard disk bracket **300a** and two first cable management covers **400a**.

The case **100a** includes an accommodation portion **110a**, a first partition part **120a**, and a second partition part **130a**. The accommodation portion **110a** has a supporting surface **111a**. The supporting surface **111a** is configured to support

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objects. The first partition part **120a** and the second partition part **130a** stand on the supporting surface **111a** of the accommodation portion **110a**, and they are spaced apart from each other.

The first hard disk bracket **200a** is located on one side of the first partition part **120a** located away from the second partition part **130a**, and the first hard disk bracket **200a** is fixed to the accommodation portion **110a** of the case **100a**. The first hard disk bracket **200a** has a plurality of first installation openings **210a** exposed to the outside. Users may, for example, insert hard disk drives **20a** into the first hard disk bracket **200a** through the first installation openings **210a** or remove the hard disk drives **20a** from the first hard disk bracket **200a** through the first installation openings **210a**.

The second hard disk bracket **300a** is located between the first partition part **120a** and the second partition part **130a**, and the second hard disk bracket **300a** is pivotably disposed on the accommodation portion **110a** of the case **100a**. The second hard disk bracket **300a** has a plurality of second installation openings, and the second hard disk bracket **300a** is pivotable relative to the accommodation portion **110a** of the case **100a** to expose or conceal the second installation openings. When the second installation openings of the second hard disk bracket **300a** are exposed to the outside, users may, for example, insert the hard disk drives **20a** into the second hard disk bracket **300a** through the second installation openings or remove the hard disk drives **20a** from the second hard disk bracket **300a** through the second installation openings.

As shown in FIG. 9, in this embodiment, there is at least one first cable management space **S4** formed between one of two opposite exterior surfaces **302a** of the second hard disk bracket **300a** and one of two opposite interior surfaces **112a** of the accommodation portion **110a**, and there is at least one another first cable management space **S4** formed between the other of the two opposite exterior surfaces **302a** and the other of the two opposite interior surfaces **112a**. There is at least one second cable management space **S5** formed between a bottom surface **301a** of the second hard disk bracket **300a** and a supporting surface **111a** of the accommodation portion **110a**. The two first cable management covers **400a** are respectively located in the two first cable management spaces **S4** and fixed to the accommodation portion **110a** of the case **100a**. One of the two first cable management covers **400a** and one of the two opposite interior surfaces **112a** of the accommodation portion **110a** together surround a first channel **S51**, and the other of the two first cable management covers **400a** and the other of the two opposite interior surfaces **112a** together surround another first channel **S51**. The first channels **S51** are configured for cables **30a** to be disposed therein. The cables **30a** located in the first channel **S51** is covered and protected by the first cable management covers **400a**, such that the cables **30a** do not tangle with the second hard disk bracket **300a** as the second hard disk bracket **300a** is pivoted relative to the accommodation portion **110a**. Therefore, the first cable management covers **400a** can provide rooms to accommodate the cables **30a**, and prevent the cables **30a** from interfering the movement of the second hard disk bracket **300a**, thereby providing a smooth movement of the second hard disk bracket **300a**.

Please refer to FIG. 7 and FIG. 8 again. In this embodiment, the server device **10a** may, for example, include a fan assembly **500a** and a host assembly **600a**. The fan assembly **500a** is located between the second hard disk bracket **300a** and the host assembly **600a**.

According to the server device as described above, the cable management spaces for cables to be disposed therein are provided on opposite sides or under the second hard disk bracket or the third hard disk bracket so as to maintain the performance of the server while achieving cable management.

Furthermore, the cable management covers are provided in the cable management spaces and fixed to the case so as to form channels. As such, the cables in the channels are covered and thus protected by the cable management covers, such that the cables do not tangle with the second hard disk bracket as the second hard disk bracket is pivoted relative to the case. Therefore, cable management covers can provide rooms to accommodate the cables, and prevent the cables from interfering the movement of the second hard disk bracket, thereby providing a smooth movement of the second hard disk bracket.

The embodiments were chosen and described in order to best explain the principles of the disclosure and its practical applications, to thereby enable others skilled in the art to best utilize the disclosure and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the disclosure be defined by the following claims and their equivalents.

What is claimed is:

1. A server device, comprising:

a case, comprising a main part and an expansion part, the expansion part mounted to one side of the main part;
a first hard disk bracket, fixed to the expansion part of the case;

a second hard disk bracket, pivotably disposed on the main part of the case, wherein a first cable management space is formed between one of two opposite exterior surfaces of the second hard disk bracket and one of two opposite interior surfaces of the main part of the case, and another first cable management space is formed between the other of the two opposite exterior surfaces of the second hard disk bracket and the other of the two opposite interior surfaces of the main part;

a third hard disk bracket, pivotably disposed on the main part of the case, wherein the second hard disk bracket is located between the first hard disk bracket and the third hard disk bracket, and at least one second cable management space is formed between a bottom surface of the third hard disk bracket and a supporting surface of the main part of the case; and

at least one first cable management cover, located in one of the two first cable management spaces and fixed to the main part of the case.

2. The server device according to claim 1, wherein the quantity of the at least one first cable management cover is two, the two first cable management covers are respectively located in the two first cable management spaces.

3. The server device according to claim 2, wherein one of the two first cable management covers and one of the two opposite interior surfaces of the main part together surround a first channel, and the other of the two first cable management covers and the other of the two opposite interior surfaces of the main part together surround another first channel.

4. The server device according to claim 1, further comprising at least one second cable management cover, wherein at least one third cable management space is formed

between one of two opposite exterior surfaces of the third hard disk bracket and one of the two opposite interior surfaces of the main part of the case, at least one another third cable management space is formed between the other of the two opposite exterior surfaces of the third hard disk bracket and the other of the two opposite interior surfaces of the main part of the case, and the at least one second cable management cover is located in one of the third cable management spaces and fixed to the case.

5. The server device according to claim 4, wherein the quantity of the at least one second cable management cover is two, the two second cable management covers are respectively located in the third cable management spaces, one of the two second cable management covers and one of the two opposite interior surfaces of the main part together surround a second channel, and the other of the two second cable management covers and the other of the two opposite interior surfaces of the main part together surround another second channel.

6. The server device according to claim 1, wherein the main part has a partition part, the partition part is located between the second hard disk bracket and the third hard disk bracket, the partition part has at least one through hole, the at least one through hole has a wide part and a narrow part connected to each other, and the wide part is located closer to the supporting surface of the case than the narrow part is to the supporting surface of the case.

7. The server device according to claim 1, wherein a part of the expansion part is located between a bottom surface of the second hard disk bracket and the supporting surface of the main part.

8. The server device according to claim 1, further comprising a host assembly and a fan assembly, wherein the fan assembly is located between the third hard disk bracket and the host assembly.

9. A server device, comprising:

a case;

a first hard disk bracket, fixed to the case;

a second hard disk bracket, pivotably disposed on the case, wherein a first cable management space is formed between one of two opposite exterior surfaces of the second hard disk bracket and one of two opposite interior surfaces of the case, another first cable management space is formed between the other of the two opposite exterior surfaces of the second hard disk bracket and the other of the two opposite interior surfaces of the case, and at least one second cable management space is formed between a bottom surface of the second hard disk bracket and a supporting surface of the case; and

at least one first cable management cover, located in one of the two first cable management spaces and fixed to the case.

10. The server device according to claim 9, wherein the case has a partition part, the partition part is located between the first hard disk bracket and the second hard disk bracket, the partition part has at least one through hole, the at least one through hole has a wide part and a narrow part connected to each other, and the wide part is located closer to the supporting surface of the case than the narrow part is to the supporting surface of the case.